PHOTOSWITCH® Photoelectric Sensors

Maximum Flexibility, Reliability and Performance

LISTEN. THINK. SOLVE.®

Allen-Bradley • Rockwell Software

Rockwell Automation

PRODUCT SPOTLIGHT

Allen-Bradley® photoelectric sensors are recognized as the most robust in the industrial automation marketplace. Designed for reliable operation, our leading products boast feature sets aimed to satisfy mainstream applications found in many industries such as material handling, packaging, food processing, transportation...the list goes on and on.

Bulletin 42JS and 42JT VisiSight™

An easy-to-apply global sensing solution in a small rectangular package

- Visible light source offered on all models for ease of alignment
- Industry standard mounting hole spacing and optional snap-on 18 mm nose-mount adapter for optimal application flexibility
- Patented ASIC design offers linear sensitivity adjustment, stability indication and excellent noise immunity
- Compact sealed housing and cavity-free design minimize collection of dust and debris while allowing for easy sensor cleanup
- Additional transmitted beam models available with infrared light source for superior cross talk immunity
- IP69K rated for high pressure washdown environment (42JT only)

Series 9000™

The industry leading solution for harsh duty applications with high pressure washdown

- Variety of standard and specialty sensing modes
- Standard ON/OFF and timing outputs
- Universal 30 mm base, thru-hole and conduit mounting options with cable, micro (M12) QD or mini QD connections

Bulletin 42EF RightSight™

Compact, flexible and reliable

- Patented compact housing with high-pressure washdown rating
- Universal 18 mm base, nose and thru-hole mounting options
- Variety of sensing modes and connection options
- DeviceNet™-enabled models offer advanced diagnostic capabilities
- Available in AC or DC models

Bulletins 42CF, 42CA, 42CS and 42CM Cylindrical Sensors

A broad range of industry standard, globally accepted sensors

- Industry standard rugged 12 mm and 18 mm metal housings
- Industry standard plastic 18 mm models for general purpose applications
- Laser models for precise sensing
- IP69K enclosure rating and ECOLAB certification (42CS)

42CF 12 mm Metal

42CA 18 mm Plastic

42CS 18 mm Stainless Steel

42CM 18 mm Metal

SENSOR SELECTION

IMPORTANT CONSIDERATIONS

Photoelectric Sensors operate by sensing a change in the amount of light that is either reflected or blocked by an object to be detected (target). The change of light could be the result of the presence or absence of the target or as the result in the change of the size, shape, reflectivity or color of a target.

These sensors can be used in applications to detect targets at distances over 300 m.

To successfully apply a photoelectric sensor the following requirements must be clearly understood:

For your selection keep in mind...

Margin: defined as the measurement of the amount of light from the light source detected by the receiver, expressed as a multiple of the minimum amount of light level required to switch the sensor output. A margin of 2X is reached when the light level received is twice the minimum required to switch the output.

For minimizing maintenance the sensor should be operated at a margin greater than 2X. Detection in dirty environments (or of a low reflectivity target) requires sensors with higher margin.

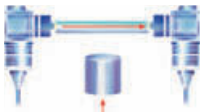
Light Operate Output (LO): output is ON (energized) when the receiver can see sufficient light from the light source.

Dark Operate Output (DO): output is ON (energized) when the receiver cannot see light from the light source.

Application Considerations

Target	Environmental	Electrical	Installation
Detection Range Object • Shape • Size • Opacity • Reflectivity • Speed	Temperature • High • Low Conditions • Wet or dry • Clean or dirty • Humidity Chemical Substances High-pressure Washdown	Supply Voltage • DC or AC Output Type • PNP, NPN • SPDT relay, MOSFET Response Time Analog Outputs Communications	Mounting Space Cable Connections • 2 m cable • Micro M12 QD • Pico M8 QD Shock/Vibration Interference • Electrical Noise • Sunlight

Standard Sensing Modes

	Advantages	Precautions
Diffuse 	• Ideal for short-range applications • No reflector required • Easy installation/alignment	• Sensing range depends on target's characteristics (color, reflectivity, etc.) • Highly reflective backgrounds may false trigger the sensor • Relatively short sensing distance
Retroreflective 	• Moderate sensing distances • Easy to align • Requires mounting and wiring of only one emitter/receiver unit	• Shorter sensing distances than transmitted beam • May detect reflections from shiny objects (see polarized retroreflective) • Reflector required
Transmitted Beam 	• High margin for contaminated environments • Longer sensing ranges than other technologies • Most reliable sensing mode for highly reflective objects	• Requires proper alignment • Not recommended for clear object sensing • Space required to mount and wire separate emitter and receiver

Specialty Sensing Modes

Polarized Retroflective	Sharp Cutoff Diffuse	Background Suppression Diffuse	Wide Angle Diffuse	Fixed Focus Diffuse	Fiber Optics
• Polarized light to overcome first surface reflections from shiny objects • Visible red LED simplifies sensor alignment	• Diffuse sensing that provides some degree of protection against sensing close backgrounds • Offers longer range than background suppression sensors	• Ignores backgrounds beyond rated sensing distance regardless of reflectivity • Designed to detect objects regardless of color at the specified distance	• Ideal for detection of objects not accurately positioned, thread or for detection over a broad area • Good at ignoring background reflections	• Accurate detection of small objects at the sensor's specified distance • Color mark detection for high contrast applications	• Allows sensing of very small parts • Fiber cables can be installed in very tight spaces • Glass fibers for high temperature applications (up to 482 °C) • Plastic fibers can be used for continuous flexing applications • Shock, noise and vibration resistant

GENERAL PURPOSE SOLUTIONS

Product Highlights / Sensing Range	100 mm	200 mm	400 mm	600 mm	800 mm	1 m	2 m	4 m	6 m	8 m	10 m	20 m	> 30 m
42JS VisiSight													
 • Industry standard small rectangular (20 mm L x 14 mm W x 33 mm H) enclosure • Visible red LED on all models for ease of alignment • Complementary LO and DO • IP67 enclosure	Diffuse (800 mm) Polarized Retroreflective (3.5 m) Transmitted Beam (10 m)												
42JT VisiSight													
 • Industry standard small rectangular (20 mm L x 12 mm W x 34 mm H) enclosure • Push button teach for easy set up • Visible red LED or Laser (Class 1) on all models for ease of alignment • Auto Detection continuously monitors and configures the output automatically to PNP or NPN • LO or DO configurable on every model • IP69K enclosure rating suitable for harsh duty environments	Diffuse (250 mm) Polarized Retroreflective (15 m) Transmitted Beam (18 m) Adjustable Background Suppression(120 mm)												
Series 9000													
 • Universal 30 mm base and thru-hole mounting • High-pressure washdown(IP69K and 1200 PSI) enclosure • Standard ON/OFF, timing and diagnostics output models • Dual (PNP and NPN) with LO or DO selection • DC and AC/DC relay output	Diffuse (1.5 m, 3 m, 4.2 m) Retroreflective (9.1 m) Polarized Retroreflective (4.9 m) Transmitted Beam (61 m, 152 m) Fiber Optic (Max: Diffuse 175 mm, Transmitted Beam 400 mm)												
RightSight													
 • Universal 18 mm base, nose and thru-hole mounting • High-pressure washdown (IP69K and 1200 PSI) enclosure • Fixed, teachable and adjustable sensitivity • Dual (PNP and NPN) outputs or complementary (LO and DO) models • DC and AC/DC solid state outputs	Diffuse (500 mm, 700 mm) Sharp Cutoff Diffuse (130 mm) Fixed Focus Diffuse (43 mm) Background Suppression (50 mm, 100 mm) Retroreflective (4.5 m) Polarized Retroreflective (3 m) Transmitted Beam (4 m, 8 m, 20 m) Fiber Optic (Max: Diffuse 275 mm, Transmitted beam 1.5 m)												
MiniSight™													
 • Compact rectangular size with 18 mm nose and thru-hole mounting • High-pressure washdown (1200 PSI) enclosure • Fast response time (300 µs) models • Selectable LO and DO • DC and AC/DC solid state outputs	Diffuse (190 mm, 380 mm) Fixed Focus Diffuse (16 mm, 43 mm) Wide Angle Diffuse (180 mm) Retroreflective (5 m) Polarized Retroreflective (2 m) Transmitted Beam (30 m) Fiber Optic (Max: Diffuse 200 mm, Transmitted Beam 550 mm)												
42CA													
 • Industry standard 18 mm enclosure • Plastic housing suitable for corrosive environments • Complementary LO and DO • Fast response time (0.5 ms) models • IP67 enclosure	Diffuse (100 mm, 400 mm, 1 m) Background Suppression (50 mm, 100 mm) Retroreflective (4.8 m, 7.2 m) Polarized Retroreflective (3.8 m) Transmitted Beam (16 m)												
42CS													
 • Robust 316L housing material • Smooth barrel version minimizes build up and allows for easy clean up (also available in threaded version) • IP69K enclosure rating and ECOLAB certification make this ideal for harsh duty environments • Industry standard 18 mm barrel diameter • Extended temperature operating range • Ferromagnetic teach provides adjustability without compromising integrity • Two teach modes: standard and precision	Diffuse (800 mm) Clear Object Detection (1 m) Adjustable Background Suppression(100 mm) Polarized Retroreflective (4 m) Transmitted Beam (20 m)												
42CM													
 • Industry standard 18 mm enclosure • Metal housing suitable for heavy duty environments • Complementary LO and DO • IP67 enclosure	Diffuse (100 mm, 400 mm) Background Suppression (50 mm, 100 mm) Retroreflective (4 m) Polarized Retroreflective (3 m) Transmitted Beam (20 m)												
42CF													
 • Industry standard 12 mm enclosure • Metal housing suitable for heavy duty environments • Local and remote teach • Selectable LO and DO • IP67 enclosure	Diffuse (300 mm) Polarized Retroreflective (2 m) Transmitted Beam (4 m)												

SPECIALTY SOLUTIONS

Adjustable Background Suppression

42JT VisiSight

- 120 mm sensing range
- Auto detection continuously monitors and configures the output automatically to PNP or NPN
- Fast response time (500 µs)
- Selectable LO and DO
- IP69K enclosure rating suitable for harsh duty environments

42BA

- Wide variety of sensing range models (30 mm, 50 mm, 100 mm, 200 mm)
- Diagnostic output
- Selectable LO and DO
- Fast response time (350 µs)
- Compact NEMA 4, 6P, IP67 enclosure

44B

- 300 mm sensing range
- Dual (PNP and NPN) outputs
- 1 ms response time
- Micro (M12) QD connection with 90° swivel for mounting flexibility
- Foreground suppression models available (200 mm sensing range)
- NEMA 4X, IP67 enclosure

42BT

- Long range background suppression (1 m and 2 m models)
- Slim flatpack housing design
- Infrared LED or Red LED depending on range
- Selectable LO and DO
- Dual (PNP and NPN) outputs
- 2 ms response time
- IP65 enclosure

42CS

- Robust 316L housing material
- Smooth barrel version minimizes build up and allows for easy clean up (also available in threaded version)
- Available in diffuse (800 mm), polarized retroreflective (4 m), transmitted beam (20m), clear object detection (1 m), and adjustable background suppression (100 mm)
- IP69K enclosure rating and ECOLAB certification make this ideal for harsh duty environments
- Industry standard 18 mm barrel diameter
- Extended temperature operating range
- Ferromagnetic teach provides adjustability without compromising integrity
- Two teach modes: standard and precision

Color and Contrast Sensors

45CRM

- Diffuse mode sensor for recording any print mark
- TEACH-IN, static and dynamic
- 50 µs response time, suitable for extremely rapid scanning processes
- Sensing range: 11 mm ± 2 mm
- 0.7 mm (effective light spot diameter)
- Complementary LO and DO

ColorSight™ 45CLR

- Wide sensing range tolerance
- Three-channel color matching (3 outputs)
- 12-32 mm sensing range
- RS-485 models can internally match up to five color configurations and communicate true RGB values
- IP67 enclosure

Clear Object Detection

Series 9000 ClearSight™

- Optimized for harsh duty
- 1.2 m sensing range
- DC and AC/DC models available
- 1 ms response time (DC)
- NEMA 3,4X, 6P, 12, 13, IP69K and 1200 psi enclosure

ClearSight RightSight

- General purpose plastic film and stretch-wrap detection solution
- 1 m sensing range
- DC and AC/DC models available
- 1 ms response time
- NEMA 3,4X, 6P, 12, 13, IP69K and 1200 psi enclosure

Fiber Optic

45FPL

- General purpose contrast sensing
- Twice the sensing range of DIN rail fiber portfolio
- Large status indicator displays
- One touch multi-directional push buttons
- Status indicator displays light levels, operating modes and diagnostic information
- Two-step static teach or dynamic teach functionality
- Two programmable sensing modes: long range (1.8 ms) and high speed (190 µs)
- Threshold value and current value display

45FVL/45FSL

- General purpose contrast sensing
- Visible red, blue, green or white light source
- Automatic or manual sensitivity adjustment (45FVL)
- 30 µs response time (45FSL)
- IP40 enclosure

RightSight™

- General purpose long range fiber optic applications (up to 1.5 meters)
- Individual fiber cables for transmitted beam and bifurcated cable for diffuse applications
- Large aperture 4.6 mm glass fiber optic cable makes it an ideal solution for high temperature environment
- DC and AC/DC models

Fork Sensors

45LSP

- 30, 50, 80 ,120 mm gap sizes
- Detection of objects as small as 0.2 mm
- Highly visible power and output LED indicators with output indication along both sides of the fork
- Selectable LO and DO
- 3 pin and 4 pin pico (M8) QD models
- 250 µs response time
- IP67 polycarbonate enclosure

45LST

- 2, 15, 30, 50, 80, 120, 225 mm gap sizes
- Rugged industrial aluminum housing
- Selectable LO or DO outputs
- 1 ms response time (30 µs on 2 mm gap model)
- IP65 enclosure

LASER SENSING SOLUTIONS

Discrete Laser Sensors

42JT VisiSight

- Industry standard small rectangular (20 mm L x 12 mm W x 34 mm H) enclosure
- Available in diffuse (250 mm), polarized retroflective (15 m), transmitted beam (18 m), and adjustable background suppression (120 mm)
- Auto Detection continuously monitors and configures the output automatically to PNP or NPN
- Class I laser
- IP69K enclosure rating suitable for harsh duty environments

LaserSight™ RightSight

- Universal 18 mm base, nose and thru-hole mounting
- Small parts detection in light duty environments
- Available in diffuse (300 mm), polarized retroreflective (15 m) and transmitted beam (40 m)
- Dual PNP and NPN outputs
- IP54 enclosure

LaserSight 42CM

- Industry standard 18 mm metal enclosure
- Metal housing suitable for heavy duty environments
- Available in diffuse (300 mm), polarized retroreflective (30 m) and transmitted beam (50 m)
- Small spot size beam (0.1 mm @ 100 mm) on diffuse for small object or contrast detection
- Complementary LO and DO
- IP67 enclosure

LaserSight 9000

- Universal 30 mm base and thru-hole mounting
- High pressure washdown (IP69K and 1200 PSI)
- For long sensing range applications (polarized retroreflective 40 m, transmitted beam 300 m)
- Dual (PNP and NPN) with LO or DO selection
- DC and AC/DC relay output enclosure

Laser Measurement

45LMS

- Diffuse range: 8 m (Class 1 laser), 15 m (Class 2 laser)
- Retroreflective model range: 50 m
- Discrete and analog outputs
- IP65 enclosure

45BPD/45BRD

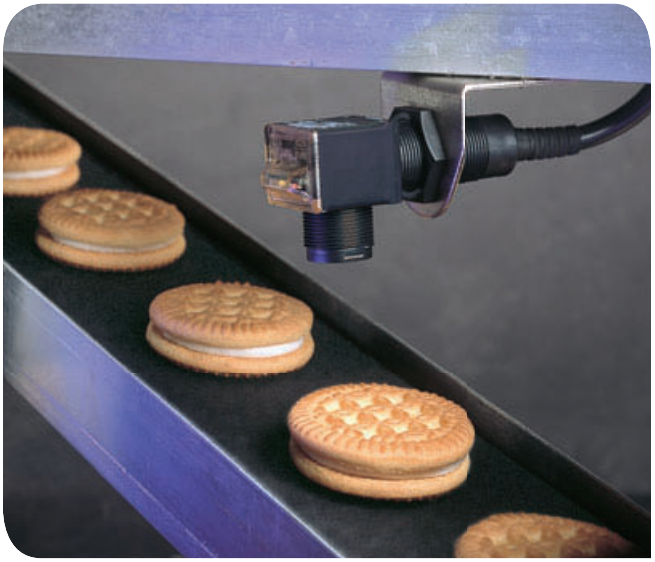
- Class 2 visible laser
- IP67 enclosure

45BPD

- 300 mm or 100 mm sensing range
- One analog (4-20 mA) and one discrete output
- Laser disable input
- Teach button lock

45BRD

- 45-85 mm sensing range
- One analog (0 -10V) output



SPECIALTY
SENSING

Rockwell Automation offers a full line of specialty Allen-Bradley sensors to solve your toughest applications using multiple sensing technologies such as clear object detection, parts verification, fork style sensing, optical label sensing, vision sensors, area array scanners and true color detection.

Discrete Laser Sensors

Laser sensors ideal for accurate detection of small targets such as weld nuts, mounting clips, holes and drill bits, etc.

- Visible light beam allows for easy sensor alignment and faster installation
- Small spot size
- Long sensing ranges
- Class 1 (eye safe) and Class 2 laser solutions

Series 9000 LaserSight

Adjustable Background Suppression Sensors

Background suppression sensors provide precise detection of objects near a background surface that should be ignored.

- Ideal for conveyor lines and vibratory bowl feeders
- Ranges up to 2 m
- AC/DC models with relay output available
- Adjustable foreground suppression for detection or irregular or shiny objects

42JT

44B

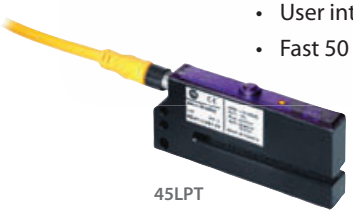
ColorSight 45CLR

- True color sensing solutions
- Three channel color matching
- RS-485 models match up to five colors and communicate true RGB values

45CLR ColorSight

45LPT Optical Label Sensor

- Specifically designed for label sensing applications
- "One touch" local and remote teach capability
- User interface lockout feature
- Fast 50 µs response time



45LPT

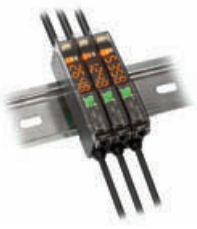
45LSP Fork Sensor

- Detection of objects as small as 0.2 mm
- Highly visible power and output LED indicators with output indication along both sides of the fork
- Remote teach and teach button lock feature

45LSP Fork Sensor

Fiber Optics

- Broad offering of fiber optic sensors
- Glass and plastic fiber optic cables in a wide variety of configurations
- Ideal for sensing very small objects, particularly in tight spaces



RightSight
Fiber Optic

Fiber Optic Cables

ADVANCED
SENSORS

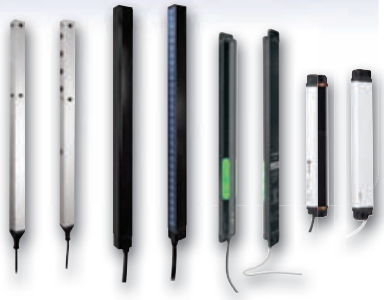
Bulletin 48MS MultiSight™ Vision Sensors

- Easy-to-use economical alternative to conventional vision systems
- Detects or differentiates objects by means of previously defined optical characteristics – great for separating "good" and "bad" parts
- Four different methods of evaluation (pattern matching, contrast, brightness, and contour matching)
- EtherNet/IP™ models feature an RSLogix™ 5000 Add-On Profile with pre-named data tags for simple integration into a control program

Allen-Bradley Light Arrays

Light Arrays offer greater sensing heights than traditional photoelectric transmitted beam pairs. The arrays feature multiple emitter or receiver elements in a single housing at a fraction of the cost of using multiple sensor pairs.

- Discrete Light Arrays (45DLA & 45AST)
- Measuring Light Arrays (45MLA)
- Bin Picking Light Arrays (45PVA)



Rockwell Automation offers a breadth of quality Allen-Bradley® components to fit your specific needs. In order to assist you with your component selection, we offer a variety of configuration and selection tools.

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